

DOCUMENT RESUME

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[Review of Some Aspects of the Authorization and Creation of the Solar Energy Research Institute]. EMD-77-67; B-186105. September 9, 1977. 11 pp.

Report to Rep. Mike McCormack, Chairman, House Committee on Science and Technology: Advanced Energy Technologies and Energy Conservation Research, Development and Demonstration Subcommittee; by Elmer B. Staats, Comptroller General.

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Authority: Solar Energy Research, Development, and Demonstration Act (P.L. 93-473). Energy Reorganization Act of 1974 (P.L. 93-438). Federal Nonnuclear Energy Research and Development Act of 1974 (P.L. 93-577). Solar Heating and Cooling Demonstration Act of 1974 (P.L. 93-409). Geothermal Energy Research, Development, and Demonstration Act. P.L. 93-410. H.R. 6796 (95th Cong.).

The substantial changes in the organization, management, and content of the solar and other energy research, development, and demonstration programs that have occurred since the Solar Energy Research Institute's (SERI's) authorization in late 1974 call into question the need for establishing SERI. There are a number of actions which the Congress may wish to consider during its deliberations on the Energy Research and Development Administration (ERDA) authorization bill for fiscal year 1978 and amendments affecting the authorization and funding of the SERI effort. Recommendations: The Congress should evaluate the impact of the changes in solar and other energy research programs which have occurred since 1974 on the need for SERI prior to making any major financial commitment to its establishment. Since there may not be time for making this evaluation prior to consideration of the ERDA authorization bill, the Congress may wish to consider funding SERI at a reduced level until such an evaluation can be made. Should the need for SERI be clearly demonstrated, ERDA or the Department of Energy should be required to give greater consideration to placing SERI at an existing laboratory. The Congress should

reject any amendment or proposal that would have the effect of authorizing or funding a regional SERI network until the need for and composition of such a network is adequately demonstrated. (SC)



COMPTROLLER GENERAL OF THE UNITED STATES  
WASHINGTON, D.C. 20548

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B-186105

September 9, 1977

03408  
The Honorable Mike McCormack  
Chairman, Subcommittee on  
Advanced Energy Technologies  
and Energy Conservation  
Research, Development, and  
Demonstration  
Committee on Science and Technology  
House of Representatives

Dear Mr. Chairman:

By letter dated August 2, 1977, you referred to our recently initiated review of the solar energy development program at the Energy Research and Development Administration (ERDA) and requested that we include, as part of that review, an examination into selected aspects surrounding the authorization and creation of a Solar Energy Research Institute (SERI). The specific areas of interest mentioned in your request were the congressional mandate for SERI, its proposed management structure, and the relationship between SERI and the regional SERI network.

Your letter also pointed out that the ERDA authorization bill for fiscal year 1978 (H.R. 6796) is scheduled to go to the House floor in early September, and that an amendment is expected to be introduced at that time that would require that \$25 million of ERDA's solar program funding be spent through SERI, with 80 percent going to the regional SERI network. Accordingly, you asked for our comments on the amendment by early September, including any questions or problems we may see in it based on our review work up to that point.

As you know, an amendment similar to the one mentioned in your letter was adopted by the Senate last June during its deliberations on the Senate version of the ERDA authorization bill. Based on a limited review of circumstances surrounding the authorization and creation of SERI, we have identified a number of areas of concern that we believe the Subcommittee, and the Congress as a whole, may wish to consider prior to final passage of any ERDA authorization bill containing such

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an amendment or the one contemplated in your request. These areas of concern are as follows:

- Changed circumstances call into question the need for SERI.
- ERDA did not give adequate consideration to placing SERI at an existing laboratory.
- ERDA's decision to create a regional SERI network appears to have been rather arbitrary and may dilute the intended role for SERI.
- Many important factors, such as the total cost for SERI and the regional SERI network, their respective work assignments and program responsibilities, organizational structure, and management interrelationships, essentially remain unknown.

In our opinion, these concerns are of sufficient magnitude to warrant the Subcommittee's deferral of the amendment in question until such concerns are resolved.

The following sections provide a perspective needed for an understanding of the concerns raised during our review as well as additional details on each specific area of concern. As agreed with your office, we did not obtain agency comments on this report because of the extremely tight reporting deadline established by the Subcommittee.

#### PERSPECTIVE

The creation of SERI was authorized on October 26, 1974, by the Solar Energy Research, Development, and Demonstration Act of 1974 (Public Law 93-473). The act was, in part, to establish a vigorous Federal program of research, development, and demonstration (RD&D) to ensure the utilization of solar energy as a viable source for our national energy needs. The act emphasized the urgency for such a program and the need for better coordination and management of the various solar energy RD&D activities which, at that time, were scattered among several Federal agencies, such as the former Atomic Energy Commission, National Science Foundation, and the National Aeronautics and Space Administration. Accordingly, the act established a Solar Energy Coordination and Management Project, headed by a Project Chairman, having overall responsibility for providing effective management and coordination of the national solar energy RD&D program.

The Project Chairman's responsibilities included bringing SERI into being. The act and the associated legislative history show that SERI was to be a facility available to the Project Chairman for performing those research and development functions deemed necessary for carrying out the Project's responsibilities. In this connection, section 10(a) of the act provides that SERI:

"\* \* \* shall perform such research, development, and related functions as the Chairman may determine to be necessary or appropriate in connection with the Project's activities under this Act or to be otherwise in furtherance of the purpose and objectives of this Act."

Section 16 of the act provided for the transfer of all Project functions and responsibilities to a new permanent agency for energy RD&D, should the creation of such an agency be enacted into law. Such a transfer appeared highly probable, because at the time of congressional deliberations on this act, the Congress was also considering legislation creating such an energy agency. Accordingly, with the creation of ERDA in January 1975, pursuant to the Energy Reorganization Act of 1974 (Public Law 93-438, dated October 11, 1974), all Project responsibilities were transferred to ERDA, including responsibility for bringing SERI into being.

ERDA's efforts to establish SERI began soon after ERDA's creation. In February 1975 ERDA requested that the National Academy of Sciences (NAS) make an indepth study to determine the optimal role and desirable characteristics for SERI. In August 1975, ERDA also contracted with the MITRE Corporation to solicit industry's opinions and recommendations on the proper role and organizational structure for SERI. ERDA also asked the general public, as well as State Governors, legislators, and other persons and institutions known to be concerned with the use of solar energy, to express their opinions on SERI.

After considering the results of the NAS and MITRE studies and the input from others, including recommendations made by ERDA's internal management, the then-ERDA Administrator decided in October 1975 that SERI should be a single, medium-sized research and development laboratory to be operated and managed by a responsible organization, which could be a nonprofit, commercial, or State or local government entity.

Accordingly, on March 12, 1976, ERDA issued a request for proposals (RFP) from organizations interested in entering into a contract with ERDA for this purpose. The RFP stated

that SERI's initial role would include such functions as program and resource assessments, information gathering and dissemination, as well as research activities in specific aspects of ERDA's solar energy program, and that this role could possibly expand at a future date to include solar energy development and related activities.

Following a comprehensive evaluation of 20 proposals submitted by organizations responding to the RFP, the ERDA Acting Administrator announced on March 24, 1977, the selection of the Midwest Research Institute--a not-for-profit research organization--as the managing/operating contractor for SERI. The announcement stated that SERI would be located in Golden, Colorado. ERDA also announced its plans to establish additional components into a regional SERI network. These components consist of regions for the Northeast, North Central, Southeast, and West.

To date, ERDA has issued planning grants to designated organizations representing three of these regions, as shown below.

<u>Region</u>	<u>Organization</u>	<u>Grant Amount</u>	<u>Grant Duration</u>
Northeast	Northern Energy Corporation	\$498,755	5/10/77 to 11/10/77
North Central	Midwest Regional Solar Energy Planning Venture	\$799,326	7/1/77 to 12/31/77
West	Western Interstate Nuclear Board	\$697,500	7/1/77 to 3/31/78

These grants are to determine the appropriate roles and organizational structures for each component of the regional SERI network. The Southeast region is currently preparing the grant application that will be submitted to ERDA for approval and award.

As of July 31, 1977, less than \$400,000 had been spent on SERI. The first major financial expenditures for SERI, however, are expected during the upcoming fiscal year. In this regard, the amounts requested in the ERDA authorization bill for fiscal year 1978 provide a level of funding for SERI of between \$8 million and \$10 million for the fiscal year and, as previously mentioned, attempts to raise this funding level to \$25 million may occur via amendment to the bill.

The concerns discussed below, however, could affect the desirability of embarking on a more substantial investment in the SERI effort. The fact that SERI has yet to become a viable operating entity should present an opportunity for the Congress to rethink its position on SERI in light of these concerns.

CHANGED CIRCUMSTANCES CALL INTO QUESTION THE NEED FOR SERI

At the time of congressional deliberations leading to passage of the Solar Energy Research, Development, and Demonstration Act of 1974, there were many unresolved issues affecting this Nation's ability to meet its energy needs. Energy RD&D programs were scattered among several Federal agencies, there was no comprehensive program for nonnuclear energy RD&D, and the level of federally supported RD&D for certain technologies such as solar and geothermal energy, was comparatively small. Thus, SERI's creation was authorized during a period of substantial uncertainty.

Many significant changes, however, have occurred since that time, resulting from aggressive congressional involvement in dealing with the issues. In late 1974, for example, the Congress enacted several pieces of energy legislation designed to consolidate many of the energy RD&D functions into a single Federal agency and to establish vigorous RD&D programs for various nonnuclear energy sources. This legislation included the following:

<u>Legislation</u>	<u>Date Enacted</u>
Solar Heating and Cooling Demonstration Act of 1974 (Public Law 93-409)	September 3, 1974
Geothermal Energy Research, Development, and Demonstration Act of 1974 (Public Law 93-410)	September 3, 1974
The Energy Reorganization Act of 1974 (Public Law 93-438)	October 11, 1974
Solar Energy Research, Development, and Demonstration Act of 1974 (Public Law 93-473)	October 26, 1974
Federal Nonnuclear Energy Research and Development Act of 1974 (Public Law 93-577)	December 31, 1974

Much of this legislation resulted in changing Federal solar energy efforts into a major RD&D program. Federal funding for solar energy RD&D increased from about \$11 million in fiscal year 1974 to about \$290 million in fiscal year 1977. Also, instead of being scattered among several agencies, the responsibility for the program is now centered in ERDA. In addition, further consolidation of Federal energy functions is presently taking place as a result of recently passed legislation creating the Department of Energy. The new Department, which will be the successor to ERDA, is scheduled to be in operation on or about October 1, 1977.

Upon ERDA's creation in January 1975, a large number of Government-owned RD&D facilities, which previously had been under the sponsorship of other agencies, were transferred to ERDA. These facilities included 17 nuclear materials and weapons production facilities; 32 laboratories specializing in such fields as nuclear engineering and physical, biomedical, and fossil energy research; and 8 multiprogram RD&D laboratories. The capital investment in these facilities as of September 1976 amounted to more than \$12 billion, which included nearly \$3 billion for the multiprogram laboratories.

During late 1974, however, there was some uncertainty about the fate of certain multiprogram laboratories--Sandia Laboratories, Los Alamos Scientific Laboratory, and Lawrence Livermore Laboratory--that were principally involved in nuclear weapons work for the former Atomic Energy Commission. Sandia Laboratories at that time also had significant ongoing efforts in solar energy RD&D. The Energy Reorganization Act of 1974 required the ERDA Administrator to conduct a review of the desirability and feasibility of transferring this work and other military applications functions to the Department of Defense or other Federal agencies. Under certain possible transfer scenarios, therefore, Sandia Laboratories' involvement in solar energy RD&D could have been seriously disrupted.

The ERDA Administrator, upon completion of the required review in January 1976, recommended that the nuclear weapons work and other military applications functions be retained in ERDA. Currently, Sandia Laboratories has viable ongoing efforts in solar energy RD&D and responsibility for a large segment of the program.

In light of the substantial changes in the organization, management, and content of energy RD&D programs that have occurred since late 1974, the need for creating SERI may be called into question. Accordingly, this need should be reexamined before SERI becomes a viable operating entity.

ERDA DID NOT GIVE ADEQUATE  
CONSIDERATION TO PLACING SERI  
AT AN EXISTING LABORATORY

From our review of ERDA's efforts to bring SERI into being, it appeared that ERDA did not give adequate consideration to placing SERI at an existing Federal laboratory. Although the Solar Energy Research, Development, and Demonstration Act of 1974 provided that SERI may be located at such an existing laboratory, ERDA decided that the Federal laboratories would not be allowed to submit proposals in response to ERDA's March 1976 RFP.

ERDA officials stated that numerous State and private organizations had expressed interest in becoming the manager/operator for SERI and that the restriction was placed on the laboratories to ensure that all organizations submitting proposals for SERI were treated equally and fairly. They explained that some of these laboratories were heavily involved in federally funded solar energy RD&D and this could have given them a preferred position, or at least an appearance of having knowledge which would have given them an unfair advantage, over other organizations.

We believe, however, that ERDA overlooked some of the obvious benefits of placing SERI at one of the existing Federal laboratories. Over the years, some of these laboratories have developed considerable scientific, technical, and management expertise in solar energy RD&D and have acquired a significant share of the Federal funding for solar work. We have determined that these laboratories are expected to have outlays of more than \$75 million for this work in fiscal year 1977. Two of the laboratories, the National Aeronautics and Space Administration's Jet Propulsion Laboratory (\$33 million) and ERDA's Sandia Laboratories (\$30 million), account for nearly 85 percent of these outlays.

We believe that, by placing SERI at one of these laboratories, ERDA could have brought SERI into being at an earlier date. This would have also provided more opportunities for utilizing the existing laboratories and capitalizing on a source of experienced researchers with some of the needed prerequisites already in place, i.e., computer capabilities, hardware, and management structure.

ERDA'S DECISION TO CREATE A REGIONAL  
SERI NETWORK APPEARS TO HAVE BEEN  
RATHER ARBITRARY AND MAY DILUTE THE  
INTENDED ROLE FOR SERI

Our review indicated that ERDA's decision to create a regional SERI network was somewhat arbitrary and may dilute the intended role for SERI.

The initial decision made by the previous ERDA Administrator to have a single SERI was based on a number of input sources including the NAS and MITRE studies, that supported that approach. We found no support, however, for ERDA's decision to create the regional network. According to ERDA officials, that decision was made at a meeting between the Acting Administrator and the then-President's Energy Advisor. These officials stated that in making the decision to have regional SERI's, no new indepth study was done. These officials also were not able to provide an adequate rationale for the decision. They did point out, however, that the solar program's rapid growth and the growing interest in solar energy throughout the country had to be considered in making the decision. Thus, the decision appeared to have been on a rather arbitrary basis.

Our examination of the legislative history of the Solar Energy Research, Development, and Demonstration Act of 1974 discloses that the nature of solar energy research required the close integration of a substantial number of competent scientists and a large amount of specifically designed equipment. It pointed out that SERI would necessitate the use of a laboratory with a large number of such scientists and equipment to effectively concentrate on complex solar energy research and development problems. SERI then could provide the needed focal point and organizational framework for solar energy research and development, and ensure rapid commercial utilization of solar energy.

Whether the Congress intended this focal point to be a single facility, however, is not clear from the legislative history. The extent to which such a focal point is established will depend on how the regional network is structured and controlled. If ERDA or its successor--the new Department of Energy--structures the regional network as an extension of SERI, and the four regions are subordinate to SERI, then it could be contended that this comes sufficiently close to establishing such a focal point. On the other hand, such a focal point would be lacking if the regional network structure is independent of SERI and is controlled directly through ERDA or the Department of Energy headquarters. ERDA,

however, has not yet decided how the regional network will interface with SERI, the other laboratories, and the headquarters organization.

MANY IMPORTANT FACTORS ABOUT SERI AND  
THE REGIONAL NETWORK REMAIN UNKNOWN

To effectively exercise its oversight responsibilities, the Congress must be provided with sufficient information for keeping fully and currently informed. Regarding SERI and the regional SERI network, such information should include a full range of cost estimates, scope of work, organizational structure, and management interrelationships. However, much of this information is still not available.

Cost of the SERI effort unknown

Our review has shown that, for the most part, ERDA does not have cost estimates for establishing and operating SERI and the regional SERI network. Although some estimates have been developed, they did not appear to be useful.

SERI's cost for its first 3 years of operation has been estimated by ERDA as follows: \$4 million to \$6 million for the first year; \$7 million to \$13 million for the second year; and \$10 million to \$20 million for the third year. The wide range by which these costs apparently can vary during these first 3 years raises a question about their usefulness. For example, costs for the first year of operation could vary from \$4 million to \$6 million--a variance of 50 percent. During the third year of SERI's operation, this variance could be as much as 100 percent. Costs beyond the third year are not yet available because, according to ERDA officials, they expect to redefine the scope of work for SERI by that time.

In addition, there are no cost estimates available for the regional SERI network. According to ERDA officials such estimates will not be known until the respective regional network programs have been specifically defined.

Work assignments and program  
responsibilities not yet defined

As presented in the RFP, SERI's functions would include program and resource assessments, information gathering and dissemination, as well as research activities in specific aspects of ERDA's solar energy program. However, the RFP was

prepared for a single SERI approach--not with a regional SERI network in mind. It is not yet clear what ultimate impact the regional network will have on SERI functions, and this will not be known until the results of the regional planning grants are available, which may not occur until March or April of 1978.

Organizational structure and management interrelationships

SERI's internal management and organizational structure is evolving as personnel come on board. Currently, SERI reports to, and is under the direction of, ERDA's Division of Solar Energy. ERDA, however, has not yet determined what the control structure will be for the regional network. The regional SERI network could report to, and be controlled by, either ERDA's Solar Energy Division or SERI. There are a number of important implications associated with the ultimate decision on organizational and management control. For example, if ERDA or the Department of Energy decides that the control will be through its headquarters organization, it may be viewed that, in fact, there are five new laboratories, thereby diluting SERI's role, as a focal point for solar energy RD&D.

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In light of the concerns discussed in this report, we believe there are a number of actions which the Congress may wish to consider during its deliberations on the ERDA authorization bill for fiscal year 1978 and any amendments that would affect the authorization and funding of the SERI effort.

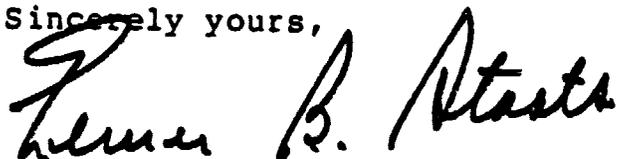
The substantial changes in the organization, management, and content of the solar and other energy RD&D programs that have occurred since SERI's authorization in late 1974 call into question the need for establishing SERI. Because of this concern, we believe the Congress should evaluate the impact of these changes on the need for SERI prior to making a major financial commitment to its establishment. We recognize that the ERDA authorization bill for fiscal year 1978 will go to the House floor in early September and there may not be sufficient time to make this evaluation. Accordingly, the Congress may wish to consider funding SERI at a reduced level until such an evaluation can be made. Should the need for SERI be clearly demonstrated, ERDA or the Department of Energy should be required to give greater consideration to placing SERI at an existing laboratory.

We further believe that, because of the current unavailability of information about the regional SERI network and the rather arbitrary justification for establishing such a network, the Congress should reject any amendment or proposal that would have the effect of authorizing and funding a regional SERI network until the need for and composition of such a network is adequately demonstrated. In this regard, we believe the Congress should require ERDA or the Department of Energy to conduct a study examining into the desirability of creating a regional SERI network and, to the extent warranted, the feasibility of using existing laboratories for this purpose.

In addition, the Congress should request ERDA or the Department of Energy to submit to the appropriate legislative committees of the Congress, a comprehensive report setting forth the total estimated cost, organizational structure, management interrelationships, and scope of work for both SERI and, to the extent warranted, the regional SERI network.

We appreciate the opportunity to assist you in this matter. As agreed with your office, copies of this letter are being sent to appropriate committee chairmen and will be available to the public.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "Thomas B. Ataska".

Comptroller General  
of the United States